What is Claimed:

1. A method for generating an interpolated picture element (pixel) at a target pixel position between two successive lines of an interlace scan image, comprising the steps of:

determining a first gradient intensity value in a first direction in a predetermined region about the target pixel position and a first magnitude value for the determined first gradient intensity value;

determining a second gradient intensity value in a second direction in the predetermined region about the target pixel position, the second direction being different from the first direction, and a second magnitude value for the determined second gradient intensity value;

determining if at least one of the first magnitude value and the second magnitude value exceeds a predetermined threshold to define the target pixel location as an edge pixel location;

if the target pixel location is an edge pixel location, comparing the first and second gradient intensity values to determine an approximate angle for the edge; and

if the target pixel location is an edge pixel location, interpolating a value for the target pixel location from the values of pixels in the interlace scan image adjacent to the target pixel and lying along the determined approximate angle.

2. A method according to claim 1 in which the step of comparing the first and second gradient intensity values includes the steps of:

identifying one of the first and second magnitude values as being larger than the other magnitude value and calculating a difference value between the larger magnitude value and the other magnitude value;

representing as bit strings said first and second magnitude values and the difference value;

identifying a most significant non-zero bit position in the bit string representing the larger magnitude value;

identifying a bit position in the bit string representing the difference value, the identified bit position corresponding to the bit position identified in the bit string representing the larger gradient intensity value;

dividing a binary value at the identified bit position in the bit string representing the difference between said first and second gradient intensity values, and a predetermined number of less significant bit positions, by respective increasing powers of two to produce respective results, and summing the results to produce a sum;

subtracting the sum from unity to generate a tangent value; and

applying the tangent value to an inverse tangent function to determine the approximate angle of the edge.

3. A method according to claim 2, wherein the step of comparing the first and second gradient intensity values to determine the angle of the edge further includes the step of reflecting the edge angle about a predetermined reference angle if the first magnitude value is greater than the second magnitude value.

4. A method according to claim 3, further including the step of comparing the first and second gradient intensity values and changing the angle of the edge in sense from positive to negative if first and second gradient intensity values are opposite in sense.

5. A method according to claim 3, further including the steps of:

generating an edge map including a plurality of pixel locations that have been determined to define edges;

filtering the edge map using first and second edge filters, the first edge filter corresponding to edges having positive angles and the second edge filter corresponding to edges having negative angles; and

determining the angle of the edge at the target pixel position to be a negative angle if the output signal of the second edge filter produces a larger output signal than the first edge filter at the target pixel position.

6. A method according to claim 3, further including the steps of:

filtering the interlace scan image using first and second edge filters, the first edge filter corresponding to edges having positive angles and the second edge filter corresponding to edges having negative angles; and

determining the angle of the edge at the target pixel position to be a negative angle if the output signal of the second edge filter produces a larger output signal than the first edge filter at the target pixel position.

7. A method according to claim 1 in which the step of comparing the first and second gradient intensity values includes the steps of:

identifying one of the first and second magnitude values as a larger value and calculating a difference between the first and second magnitude values;

representing as bit strings said first and second magnitude values and the difference between said first and magnitude values;

identifying a most significant non-zero bit position in the bit string representing the larger magnitude value;

identifying a bit position in the bit string representing the difference between said first and second magnitude values, the identified bit position corresponding to the bit position identified in the bit string representing the larger magnitude value;

selecting one coefficient set from among a plurality of coefficient sets responsive to the larger magnitude value, each coefficient set including a plurality of coefficient values;

multiplying each one-bit value corresponding to the identified bit position in the bit string representing the difference between said first and second magnitude values, and a predetermined number of less significant bit positions, by respectively

different ones of the coefficient values in the selected coefficient set to produce a plurality of results; and

summing the plurality of results to determine the angle of the edge.

8. A method according to claim 7, wherein the step of comparing the first and second gradient intensity values to determine the angle of the edge further includes the step of reflecting the edge angle about a predetermined reference angle if the first magnitude value is greater than the second magnitude value.

9. A method according to claim 8, further including the step of comparing the first and second gradient intensity values and changing the angle of the edge in sense from positive to negative if the first and second gradient intensity values are opposite in sense.

10. A method according to claim 8, further including the steps of:

generating an edge map including a plurality of pixel locations that have been determined to define edges;

filtering the edge map using first and second edge filters, the first edge filter corresponding to edges having positive angles and the second edge filter corresponding to edges having negative angles; and

determining the angle of the edge at the target pixel position to be a negative angle if the output signal of the second edge filter produces a larger output signal than the first edge filter at the target pixel position.

11. A method according to claim 1 in which the step of comparing the first and second gradient intensity values includes the steps of:

identifying one of the first and second magnitude values as being larger than the other magnitude value and calculating a difference value between the larger magnitude value and the other magnitude value;

representing as bit strings said first and second magnitude values and the difference value;

identifying a most significant non-zero bit position in the bit string representing the larger magnitude value;

identifying a bit position in the bit string representing the difference value, the identified bit position corresponding to the bit position identified in the bit string representing the larger gradient intensity value;

applying the identified bit position and a plurality of less significant bit positions in the bit string representing the difference value to combinational logic to determine the approximate angle of the edge.

12. A method according to claim 11, wherein the step of comparing the first and second gradient intensity values to determine the angle of the edge further includes the step of reflecting the edge angle about a predetermined reference angle if the first magnitude value is greater than the second magnitude value.

13. A method according to claim 11, further including the step of comparing the first and second gradient intensity values and changing the angle of the edge in sense from positive to negative if the first and second gradient intensity values are opposite in sense.

14. A method according to claim 11, further including the steps of:

generating an edge map including a plurality of pixel locations that have been determined to define edges;

filtering the edge map using first and second edge filters, the first edge filter corresponding to edges having positive angles and the second edge filter corresponding to edges having negative angles; and

determining the angle of the edge at the target pixel position to be a negative angle if the output signal of the second edge filter produces a larger output signal than the first edge filter at the target pixel position.

15. Apparatus for generating an interpolated picture element (pixel) at a target pixel position between two successive lines of an interlace scan image, comprising:

a first filter configured to filter successive lines of the interlace scan image in a region about the target pixel position to generate a first gradient intensity value having a first magnitude value and a first sense value;

a second filter configured to filter successive lines of the interlace scan image in a region about the target pixel position to generate a second gradient intensity value having a second magnitude value and a second sense value, wherein the second gradient intensity value is with respect to a different angle than the first gradient intensity value;

a comparator which determines if at least one of the first magnitude value and the second magnitude value exceeds a predetermined threshold to define the target pixel location as being an edge pixel location;

combinational logic that combines the first and second gradient intensity values to determine an angle for the edge; and

an interpolator that combines values of pixels in the interlace scan image adjacent to the target pixel and lying along the determined angle to generate the interpolated pixel.

16. Apparatus according to claim 15 wherein the combinational logic includes:

a comparator that compares the first and second magnitude values to identify a larger magnitude value and a smaller magnitude value;

a subtractor that subtracts the smaller magnitude value from the larger magnitude value to generate a difference value, wherein at least the larger magnitude value and the difference value are represented as bit-strings;

logic circuitry, coupled to receive the larger magnitude value which identifies a most significant non-zero bit position in the larger magnitude value;

Arithmetic circuitry which divides a one-bit value at the identified bit position in the bit string representing the difference value, and a predetermined number of less significant bit positions, by respective increasing powers of two to produce

respective results; and which sums the results and subtracts the sum from unity to generate a tangent value; and

a look-up-table which is programmed to return the angle of the edge in response to the tangent value.

17. Apparatus according to claim 16, wherein the look-up table is responsive to a signal indicating that the first magnitude value is greater than the second magnitude value for reflecting the angle of the edge about a predetermined reference angle.

18. Apparatus according to claim 17, wherein the look-up table is responsive to a signal indicating that the first sense value is different from the second sense value for changing the angle of the edge from positive to negative.

19. Apparatus according to claim 17 further comprising:

an edge map memory configured to hold a binary value for each pixel position, wherein pixel positions in the edge map memory that have been determined to define edges are assigned a first value and pixel positions that have not been determined to define edges are assigned a second value, different from the first value;

a first edge filter corresponding to edges having negative angles which filters the edge map to produce a negative angle output value; and

a second edge filter corresponding to edges having positive angles which filters the edge map to produce a positive angle output value.

20. Apparatus according to claim 17, further comprising:

a first edge filter corresponding to edges having negative angles which filters the interlace scan image to produce a negative angle output value; and

a second edge filter corresponding to edges having positive angles which filters the interlace scan image to produce a positive angle output value.

21. Apparatus according to claim 15 wherein the combinational logic includes:

a comparator that compares the first and second magnitude to identify a larger magnitude value and a smaller magnitude value;

a subtractor that subtracts the smaller magnitude value from the larger magnitude value to generate a difference value, wherein at least the larger magnitude value and the difference value are represented as bit-strings;

logic circuitry, coupled to receive the larger magnitude value which identifies a most significant non-zero bit position in the larger magnitude value;

a selector, responsive to the larger magnitude value for selecting a single coefficient set from among a plurality of coefficient sets, each coefficient set including a plurality of coefficient values;

Arithmetic circuitry which multiplies a one-bit value at the identified bit position in the bit string representing the difference value, and a predetermined number of less significant bit positions, by respectively different ones of the plurality of coefficient values in the selected coefficient set; and which sums the results to determine the angle of the edge.

22. Apparatus according to claim 21, wherein the combinational logic further includes a further comparator that generates a one-bit value which has a first value if the first magnitude value is greater than the second magnitude value and has second value, different from the first value if the first magnitude value is not greater than the second magnitude value, wherein the generated one-bit value is concatenated with the determined angle of the edge to represent angles greater than and less than a predetermined reference angle.

23. Apparatus according to claim 22, wherein the combinational logic further includes further logic circuitry that generates a further one-bit value which has a first value if the first sense value is different from the second sense value, wherein the further one-bit value is concatenated with the determined angle as a sign bit.

24. Apparatus according to claim 22 further comprising:

an edge map memory configured to hold a binary value for each pixel position, wherein pixel positions in the edge map memory that have been determined to

define edges are assigned a first value and pixel positions that have not been determined to define edges are assigned a second value, different from the first value;

a first edge filter corresponding to edges having negative angles which filters the values held in the edge map memory to produce a negative angle output value; and

a second edge filter corresponding to edges having positive angles which filters the values held in the edge map memory to produce a positive angle output value.

25. Apparatus according to claim 22, further comprising:

a first edge filter corresponding to edges having negative angles which filters the interlace scan image to produce a negative angle output value; and

a second edge filter corresponding to edges having positive angles which filters the interlace scan image to produce a positive angle output value.

26. Apparatus according to claim 15 wherein the combinational logic includes:

a comparator that compares the first and second magnitude to identify a larger magnitude value and a smaller magnitude value;

a subtractor that subtracts the smaller magnitude value from the larger magnitude value to generate a difference value, wherein at least the larger magnitude value and the difference value are represented as bit-strings;

logic circuitry, coupled to receive the larger magnitude value which identifies a most significant non-zero bit position in the larger magnitude value;

further logic circuitry, responsive to the identified bit position in the difference value and a plurality of less significant bit positions in the difference value to produce a multi-bit output value representing the angle of the edge.

27. Apparatus according to claim 26, wherein the combinational logic further includes a further comparator that generates a one-bit value which has a first value if the first magnitude value is greater than the second magnitude value and has

second value, different from the first value if the first magnitude value is not greater than the second magnitude value, wherein the generated one-bit value is concatenated with the multi-bit value representing the angle of the edge to represent angles greater than and less than a predetermined reference angle.

28. Apparatus according to claim 27, wherein the combinational logic further includes further logic circuitry that generates a further one-bit value which has a first value if the first sense value is different from the second sense value, wherein the further one-bit value is concatenated with the multi-bit value representing angles greater than and less than the predetermined reference angle as a sign bit.

29. A computer readable carrier including computer program instructions, the computer program instructions causing a computer to perform a method for generating an interpolated picture element (pixel) at a target pixel position between two successive lines of an interlace scan image, the method comprising the steps of:

determining a first gradient intensity value in a first direction in a predetermined region about the target pixel position and a first magnitude value for the determined first gradient intensity value;

determining a second gradient intensity value in a second direction in the predetermined region about the target pixel position, the second direction being different from the first direction and a second magnitude value for the determined second gradient intensity value;

determining if at least one of the first magnitude value and the second magnitude value exceeds a predetermined threshold to define the target pixel location as an edge pixel location;

if the target pixel location is an edge pixel location, comparing the first and second gradient intensity values to determine an approximate angle for the edge; and

if the target pixel location is an edge pixel location, interpolating a value for the target pixel location from the values of pixels in the interlace scan image adjacent to the target pixel and lying along the determined approximate angle.

30. A computer readable carrier according to claim 29, wherein the computer program instructions that cause the computer to perform the step of comparing the first and second gradient intensity values cause the computer to perform the steps of:

identifying one of the first and second magnitude values as being larger than the other magnitude value and calculating a difference value between the larger magnitude value and the other magnitude value;

representing as bit strings said first and second magnitude values and the difference value;

identifying a most significant non-zero bit position in the bit string representing the larger magnitude value;

identifying a bit position in the bit string representing the difference value, the identified bit position corresponding to the bit position identified in the bit string representing the larger gradient intensity value;

dividing a binary value at the identified bit position in the bit string representing the difference between said first and second gradient intensity values, and a predetermined number of less significant bit positions, by respective increasing powers of two to produce respective results, and summing the results to produce a sum;

subtracting the sum from unity to generate a tangent value; and

applying the tangent value to an inverse tangent function to determine the angle of the edge.